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A REPORT ON
THE COTTONWOOD CREEK THINNING PLOTS COMPUTATIONS

The Cottonwood Creek thinning plots were laid out in late 1928 and early 1929. Plot 1 was maintained as a control while plots 2 and 3 were thinned in 1928 and 1948. Originally all plots were 0.3 acre in area, but CCC road construction reduced that for plot 1 to 0.24 acre. Trees affected by this change of area are indicated on the typed tally sheets for the plot.

Tallies on plots 2 and 3 were carried to 3 inches originally but to 4 inches on plot 1. This necessitated curving d.b.h. growths and extrapolating to carry some of the trees in the 1948 tally back to their 1928 diameter to fill out the 1928 stand table down to 3 inches. This was done in figure 1.

Stand tables and basal area

Stand tables were constructed for number of trees in each 0.1-inch d.b.h. class (starting at 3.0 inches) and crown class for each plot as of 1928. From these, basal areas were computed by the same d.b.h. and 1928 crown classes. These are shown in tables 1, 2, and 3 which are the reserve after thinning in 1928 (plot 1) and 1929 (plots 2 and 3).[1/] A similar tally was made for trees removed in

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1/ For all practical purposes all three plots may be considered as established in the fall of 1928, judging from actual dates of establishment.

thinning in 1928 for plots 2 and 3; this is shown in tables 2A and 3A. The table used for computation of basal areas will be found in the RS-ME--General--Volume tables file folder.

In each stand table, number of trees and basal areas were converted to a per acre basis, by crown class. The crown class labeled "Damaged" includes trees bowed down by snow or otherwise affected so that the usual crown categories did not apply. The presence of a 25-inch tree on plot 1 also affects computations. It was included in the above tables, but not included in summation tables as indicated.

The same computations were also made for each plot before thinning in 1948, and include the new trees (ingrowth), figures for which are indicated in red. Crown classes used here are as of 1948. These are shown in tables 4, 5, and 6.

Sums by crown classes are separated according to "original trees" and "ingrowth" in tables 4A, 5A, and 6A and are expressed on a per acre basis.

Tables 4B, 5B, and 6B show mortality losses for the period in numbers of trees, basal area, and cubic feet. These computations are based on 1928 (or 1929) measurements.

Tables 7 and 8 show reserves for plots 2 and 3 following the 1948 thinnings (plot 1 remained untreated). The same data (numbers

of trees and basal areas) for trees removed in 1948 are given in 7A and 8A. Reserves after thinning, in terms of original trees and ingrowth, are summed up per acre in 7B and 8B.

Average d.b.h., computed from basal areas, for each crown class and all crown classes combined are shown for 1928 and 1948 in table 9.

Volume (cubic feet and cords)

Computations for volume necessitated the construction of two local cubic-foot volume tables, one for 1928 and one for 1948, since a change in the height-diameter relationship was apparent. These were made by the usual method of curving heights over diameters, reading averages and interpolating in a standard table. Heights (60 for 1928, 95 for 1948) were taken from all three plot tally sheets by taking the first 4-inch (3.6-4.5 inches) tree, the first 5-inch, the first 6-inch tree, etc., from a page until one from each of as many classes as were represented on the page was listed. The same was done on the next page and so on through the tally sheets. These are shown in tables 10 and 11. Curved heights are shown in figures 2 and 3. Averages were read off, entered in tables 10A and 11A and interpolated in Meyer's table 32, USDA Technical Bulletin 630. Figure 4 is merely a check made on the 2-way interpolations for 1948 volumes.

Table 12 shows cubic-foot and cord volumes for reserve stands and thinnings for 1928 (and 1929) and 1948, in trees from 4 inches up. Conversion of cubic feet to cords was made using 80 cubic feet = 1 cord. For comparison, this table also shows volumes in cords using

a local volume table based on trees in Bannock Creek, entitled "Ponderosa Pine Local Cordwood Volume Table--Bannock Creek" (RS-ME--General--Volume Tables file).

Results in terms of cords are summed up in table 13 and growth percents computed.

Volumes (cubic feet) contributed by ingrowth are computed in table 14 (mortality losses were included in tables 4B, 5B, and 6B).

Table 15 is a general summation of data for numbers of trees, basal areas, and cubic volumes for all three plots on a per acre basis, with data also shown as percentages of the original stand volume.

Methods of Chapter IV, Edition 4, of Snedecor's text were used in making "t" tests for differences between mean basal areas as of 1928 (original stand) and again as of 1948 (before thinning). Computations are shown in tables 16 and 17. Plots 1 and 2 did not differ significantly in average at either date. Plots 1 and 3 differed in 1928 but do not differ as of 1948.

In May 1950, certain of the trees on each plot were selected as crop trees, mainly on the basis of their 1928 crown class, together with the factor of spacing, and marked with a band of traffic yellow paint above breast height. Based on stocking figures in Meyer's Technical Bulletin 630, the ideal would have been to get 100 properly spaced crop trees per acre, or 24 on plot 1, 30 on

each of plots 2 and 3. Actual numbers marked were 12 on plot 1, 21 on plot 2, and 22 on plot 3. The tree numbers for these are listed on sheets with the field sheets and indicated as well on the typed plot tally sheets. Data on diameter growth of these trees are given in table 18 of computations.

Computation tables described above will be found in the research folder for these plots.

In the 1948 remeasurement, tags had been put on the new trees. However, some trees tagged as new were below 3.0 inches and, since they could not well be used when the lowest diameter recorded in 1928-29 was 3.0 inches, these tags were removed in May 1950. A list of these tags removed is with the field tally sheets.

Further work to be done

Field work. Continue backing off nails on ingrowing tags and listing new tags needed where nails cannot be backed without spoiling present tag. A start was made on this for the lower half of plot 3 and a partial list of new tags needed is with field sheets.

Girdle the sawtree (27 inches in 1948) on plot 1.

A short summary of the results obtained after the 1948 remeasurement has been prepared for Administration's information, using data of tables 15 and 9.

Suggestions for 5-year remeasurement

1. Should be done in fall of 1952 or early spring of 1953.

2. No thinnings believed necessary.

3. Omit taking heights; the 1948 height curve and volume table should still be satisfactory for volume computations.

4. Omit trying to get diameters of dead trees. Record "Dead" opposite tree number and cause of death under "Damage."

5. Omit "Damage" entries other than those resulting in the tree's death. However, if circumstances allow more detailed study of damage, it is suggested that the damage code (1948) given in Richman's report on the remeasurement of the Pine Creek MC Plots be used.

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